

**Amendment and Response**

Applicant: Jeffrey Allen Neilsen et al.

Serial No.: 10/603,896

Filed: June 24, 2003

Docket No.: 100201650-1

Title: METHOD AND SYSTEMS FOR PRODUCING IMPROVED COLORING IN AN OBJECT  
PRODUCED THROUGH SOLID FREEFORM FABRICATION

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**IN THE CLAIMS**

Please add claims 65-68.

Please amend claims 1 and 48 as follows:

1. (Currently Amended) A method of improving color quality in an object created by a solid freeform fabrication system that uses a fluid ejection process to build successive layers of the object being fabricated, the method comprising:

ejecting a first material to form a layer of a three-dimensional object, the first material containing a colorant;

providing a second material; and

causing a reaction between the first material and the second material that renders the colorant insoluble and reduces penetration of the colorant to keep keeps the colorant near a surface of the layer object,

wherein the first material comprises a binder or a build material, and the second material comprises a binder or a build material.

2. (Original) The method of claim 1, wherein causing a reaction comprises precipitating the colorant out of the first material.

3. (Previously Presented) The method of claim 2, wherein causing a reaction further comprises the second material precipitating the colorant out of the first material.

4. (Original) The method of claim 3, wherein ejecting a first material comprises ejecting a binder.

5. (Original) The method of claim 4, wherein providing a second material comprises ejecting a second binder.

6. (Original) The method of claim 4, wherein providing a second material comprises providing a powdered build material into which the first material is ejected.

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7. (Previously Presented) The method of claim 1, wherein ejecting a first material comprises ejecting a solidifiable build material.
8. (Previously Presented) The method of claim 1, wherein providing a second material comprises ejecting a solidifiable support material.
9. (Previously Presented) The method of claim 2, wherein precipitating the colorant out of the first material comprises causing a pH reaction.
10. (Previously Presented) The method of claim 9, wherein the colorant in the first material is sensitive to pH, and wherein causing a pH reaction comprises the second material having a pH sufficiently different from a pH of the first material to cause the colorant to precipitate out of the first material upon contact of the first and second materials.
11. (Original) The method of claim 10, wherein the pH of the second material is lower than the pH of the first material.
12. (Original) The method of claim 11, wherein the colorant in the first material is a dye selected from the group consisting of carboxylated azo dyes, carboxylated copper phthalocyanine dyes, carboxylated xanthene dyes, and dyes whose solubility decreases as pH is lowered.
13. (Original) The method of claim 10, wherein the pH of the second material is higher than the pH of the first material.
14. (Original) The method of claim 10, wherein the pH differential between the first material and the second material ranges from about 2.5 to 7 units.
15. (Previously Presented) The method of claim 2, wherein precipitating the colorant out of the first material comprises causing an anionic-cationic reaction.

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16. (Original) The method of claim 15, wherein the colorant of the first material is anionic, and wherein causing a reaction comprises providing a cationic second material to cause the colorant to precipitate out of the first material upon contact of the first and second materials.

17. (Original) The method of claim 15, wherein the colorant of the first material is cationic, and wherein causing a reaction comprises providing an anionic second material to cause the colorant to precipitate out of the first material upon contact of the first and second materials.

18. (Original) The method of claim 1, wherein the colorant is a dye.

19. (Original) The method of claim 1, wherein the colorant is a pigment.

20-47. (Cancelled)

48. (Currently Amended) A method of improving color quality in a three-dimensional object created by a solid freeform fabrication system that uses a fluid ejection process to build successive layers of the three-dimensional object being fabricated, the method comprising:

forming a layer of the three-dimensional object, including providing contact between a first material and a second material, the first material containing a colorant; and

forcing the colorant to become insoluble and precipitating the colorant out of the first material upon contact of the first and second materials such that the colorant remains near a surface of the layer.

wherein the first material comprises a binder or a build material, and the second material comprises a binder or a build material.

49. (Previously Presented) The method of claim 48, wherein precipitating the colorant out of the first material keeps the colorant near a surface of the object.

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---

50. (Previously Presented) The method of claim 48, wherein the first material comprises a binder.

51. (Previously Presented) The method of claim 50, wherein the second material comprises a second binder.

52. (Previously Presented) The method of claim 50, wherein the second material comprises a powdered build material into which the first material is ejected.

53. (Previously Presented) The method of claim 48, wherein the first material comprises a solidifiable build material.

54. (Previously Presented) The method of claim 48, wherein precipitating the colorant out of the first material comprises causing a pH reaction.

55. (Previously Presented) The method of claim 48, wherein the colorant in the first material is sensitive to pH, and wherein causing a pH reaction comprises the second material having a pH sufficiently different from a pH of the first material to cause the colorant to precipitate out of the first material upon contact of the first and second materials.

56. (Previously Presented) The method of claim 55, wherein the pH of the second material is lower than the pH of the first material.

57. (Previously Presented) The method of claim 56, wherein the colorant in the first material is a dye selected from the group consisting of carboxylated azo dyes, carboxylated copper phtyalocyanine dyes, carboxylated xanthene dyes, and dyes whose solubility decreases as pH is lowered.

58. (Previously Presented) The method of claim 55, wherein the pH of the second material is higher than the pH of the first material.

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59. (Previously Presented) The method of claim 55, wherein the pH differential between the first material and the second material ranges from about 2.5 to 7 units.

60. (Previously Presented) The method of claim 48, wherein precipitating the colorant out of the first material comprises causing an anionic-cationic reaction.

61. (Previously Presented) The method of claim 60, wherein the colorant of the first material is anionic, and wherein causing an anionic-cationic reaction comprises providing a cationic second material to cause the colorant to precipitate out of the first material upon contact of the first and second materials.

62. (Previously Presented) The method of claim 60, wherein the colorant of the first material is cationic, and wherein causing an anionic-cationic reaction comprises providing an anionic second material to cause the colorant to precipitate out of the first material upon contact of the first and second materials.

63. (Previously Presented) The method of claim 48, wherein the colorant is a dye.

64. (Previously Presented) The method of claim 48, wherein the colorant is a pigment.

65. (New) The method of claim 1, wherein causing a reaction comprises inhibiting migration of the colorant into the object.

66. (New) The method of claim 9, wherein the pH reaction decreases solubility of the colorant.

67. (New) The method of claim 48, wherein forcing the colorant to become insoluble and precipitating the colorant out of the first material comprises inhibiting migration of the colorant and reducing penetration of the colorant into the object.

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68. (New) The method of claim 54, wherein the pH reaction decreases solubility of the colorant.